Effects of interventions based on the transtheoretical model for increasing physical activity in elderly: systematic review

Efectos de intervenciones basadas en el modelo transteórico para incrementar la actividad física en adultos mayores: revisión sistemática

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Abstract

Abstract: It is essential to introduce measures that encourage physical activity among the elderly population. These measures should be based on theoretical models that motivate individuals to adopt healthy behaviors to improve their health. This systematic review aimed to determine the impact of exercise interventions based on the transtheoretical model on increasing physical activity levels among elderly.
Method: The search was performed on the PubMed database. Ten studies were selected according to the eligibility criteria: adults aged 65 years or older; intervention through programs based on the Transtheoretical Model. The PEDro scale was used to assess the quality of the studies.
Results: Seven studies were included, which showed that an intervention based on the transtheoretical model in the elderly has positive effects on increasing physical activity.
Conclusions: The results of this review support the use of the transtheoretical model in interventions to promote physical activity habits in the elderly. Exercise professionals should include this approach in their programs to increase adherence to physical activity and stages of change in their elderly participants.

Keywords

Exercise; fitness; health; behavior change; motor development.

Resumen

Resumen: Es fundamental llevar a cabo intervenciones dirigidas a aumentar el nivel de actividad física entre la población mayor de 65 años. Para ello, es importante basar estas intervenciones en modelos teóricos cuyo objetivo sea motivar a las personas para que adopten conductas saludables en beneficio de su salud. El objetivo de esta revisión sistemática fue identificar los efectos de las intervenciones de ejercicio basadas en el modelo transteórico sobre el aumento de la actividad física en los ancianos.
Metodología: La búsqueda se realizó en la base de datos PubMed. Se elegirán diez estudios según los criterios de elegibilidad: personas de 65 años o más; intervención mediante programas basados en el modelo transteórico. Se utilizó la escala PEDro para evaluar la calidad de los estudios.
Resultados: Se incluyeron siete estudios que demostraron que una intervención basada en el modelo transteórico en personas tiene efectos positivos en el aumento de la actividad física.
Conclusiones: Los resultados obtenidos en esta revisión apoyan el uso del modelo transteórico en intervenciones dirigidas a promover hábitos de actividad física en personas mayores. Los profesionales del ejercicio físico deberían incluir este tipo de enfoque en sus programas con el fin de aumentar la adherencia a la actividad física y las etapas de cambio en sus participantes de edad avanzada.

Palabras clave

Ejercicio; forma física; salud; cambio de comportamiento; desarrollo motor.

Introduction

In recent decades, Europe has been experiencing profound demographic changes characterized, among other things, by an increase in longevity and elderly population and a reduction in the birth rate and young population (Eurostat, 2020). This population ageing trend is expected to continue to increase around the world. The World Health Organization (WHO, 2020) estimates that by 2050, the number of older people (60 years and over) will be, for the first time in history, more significant than the number of teenagers worldwide, reaching 2 billion people (Rudnicka et al., 2020).

Given the relevance of studying the ageing process, it is important to understand that this is a gradual, universal, and irreversible process that causes a progressive loss of functionality (Da Costa et al., 2016; Lemoine, 2020; Nahas, 2017). This process is characterized by several organic changes, such as the reduction in balance ability and mobility, physiological, respiratory, and circulatory capacities, and psychological changes, like increased vulnerability to depression (Dos Santos Fernandes et al., 2024; Nahas, 2017). All of these changes contribute to a decrease in the elderly's physical activity, which in turn increases the severity of these adaptations. These costs are not only borne at the personal level but also by the entire family structure and, at a more macro level, by the country itself through increased health expenditure (Ambrose et al., 2013; Lehnert et al., 2011; Scheffer et al., 2008).

Promoting active and healthy aging throughout the lifespan has been indicated as a response and even a solution to the challenges related to longevity and population aging (Lopes Santos De Brito et al., 2023; Nahas, 2017). Physical activity and physical fitness have been associated with people's well-being, autonomy, health, and quality of life (Hernández-Cortés et al., 2019; Nahas, 2017). The elderly prioritize their health and are beginning to realize the importance of physical activity to prolong a good quality of life and their autonomy (Araújo, 2015). Although they began to realize the importance of physical activity, the motivation to perform it continues to be a barrier to the practice (Rhodes & Sui, 2021). Motivation is understood as a person's present state or the stage of preparation for change, being essential for any process of personal change (Swarna Nantha, 2013). This motivation can be influenced by several factors, including the motivational coaching climate, for example, supervised training environments, an empowering motivational climate, characterized by support, encouragement, and autonomy, can lead to higher adherence to physical activity(Birr et al., 2023).

Recognizing these premises, the Transtheoretical Model (TTM) was developed as a model of intentional change that focuses on the individual's decision-making regarding physical activity (Velicer et al., 1998). This model proposes that health behavior change involves progress through five stages of change: precontemplation, contemplation, preparation, action, and maintenance (Prochaska & Velicer, 1997). Throughout these stages, the individual transitions from the starting point of having no intention to commence physical activity within the next six months in the pre-contemplation phase to the maintenance of regular practice for over six months in the maintenance phase (detailed explanation present in Table 1).

Table 1. Transtheoretical Model (TTM) adapted from Prochaska & Velicer (1997)

TTM Phases	Description
Precontemplation	Inactive. No intention to engage in regular PA in the next 6 months.
Contemplation	Inactive but intend to engage in regular PA in the next 6 months
Preparation	Started to commitment to engage in regular PA.
Action	Established engagement in regular PA but have done so for less than 6 months
Maintenance	Maintained engagement of regular PA for longer than 6 months.

Notes: PA = physical activity

To provide a better quality of life for the elderly, as well as alleviate the pressure of the aging population on families and the economy, the implementation of interventions that promote the practice of physical activity in the elderly is crucial (Chia et al., 2023). To ensure greater adherence and success of interventions, the motivation of the elderly cannot be overlooked, so basing these interventions on theoretical models that explain and motivate participants to make behavioral changes for health could be the solution. In this sense, this review aimed to analyze evidence-based studies showing the potential effects of interventions to promote physical activity adherence in the elderly based on the transtheoretical model.

Method

The present review was conducted according to the preferred reporting items for systematic reviews and meta-analyses (PRISMA2020) guidelines (Page et al., 2021), and registered in the OSF platform with the project number osf.io/y9c5s.

Eligibility criteria

The research question was framed by the PICOS acronym (Richardson et al., 1995) according to the following topics: P (population), which was defined as elderly people aged 65 or over; I (intervention) as the intervention based on the transtheoretical model; C (comparison) as a comparison between intervention and control groups (i.e., groups with no exercise or with exercise without considering the transtheoretical model); O (outcomes) as the outputs related to the practice of physical activity such as physical fitness outcomes (e.g., cardiorespiratory, muscle endurance, balance, etc.), health improvements (e.g., reducing blood pressure, diabetes, or psychological benefits such as improving well-being); it were considered all the outcomes of physical activity practice evaluated by the studies reviewed; and S (study design) as randomized controlled intervention studies.

Inclusion criteria were: i) elderly participants aged 65 years or older; ii) interventions based on the transtheoretical model; iii) the studies evaluated the effects of the intervention in the practice of physical activity; iv) randomized controlled studies.

Search strategy and sources

The search was conducted on the PubMed online database, using the following search strategy: "((older) OR (elderly) OR (senior)) AND (transtheoretical model) AND ("physical activity")". In order to maximize our search, we chose to look for keywords throughout the all article and not just in the title and abstract. PubMed was chosen for its extensive biomedical coverage and high-quality peer-reviewed articles. Two filters were applied: the randomized controlled trial for the study design and the age of 65+ years for the participant's age. It only used keywords in English; however, no language restrictions were defined (e.g., Mercê et al., 2021). The search dates covered the database's inception until 18th March 2024.

Study selection

The studies were selected in different phases: reading the title, abstract and full text. Two authors performed all phases independently, and disagreements were resolved through discussion and, when needed, with the intervention of a third reviewer (Mercê et al., 2021). The studies that did not meet the objectives of this review and/or did not meet the eligibility criteria were excluded. The process is graphically represented in Figure 1.

Data extraction

To answer the review question, the following data were collected from the reviewed articles: author, year, country, sample characterization, intervention effects based on the transtheoretical model and principal conclusions. The findings were compared based on the effectiveness of the interventions and the specific outcomes measured. The data were presented in Table 1 and were described and discussed throughout the discussion section. As this study is based on a systematic review (and not a meta-analysis), the critical analysis of the results will be carried out in a qualitative way by discussing them and comparing them with each other and with other studies.

Quality assessment

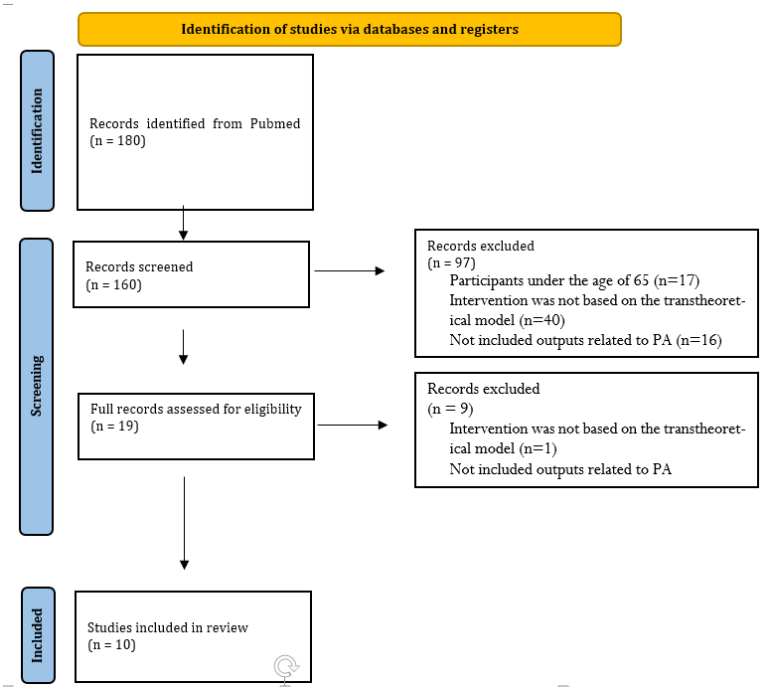
The quality assessment of the studies in this systematic review was performed by completing the PEDro Scale checklist (Table 1) randomized or quasi-randomized controlled trials (Costa, 2011). Based on its score the studies' quality can be classified as poor (0-3 points), fair (4-5 points) and good (6-8 points) and excellent (9-10 points) (de Morton, 2009; Hariohm et al., 2015; Maher, 2000).

Results

Study Selection

The initial search retrieved 28 records. After the review, eight articles met the inclusion criteria and were included in the review (see flowchart in Figure 1).

Figure 1. Flowchart of the Systematic Review



Study Characteristics

The sample sizes in the included studies range from 69 to 450, with a total of 2.038 elderly individuals in the ten studies. All studies used the assessed physical activity levels and stages of behavioral change, nonetheless only two of the studies assessed functional fitness. All the studies were rated “good” (i.e., values on Peter's scale between 6 and 8), which reinforces the quality of their results. A summary of the studies, including sample characteristics, a brief description of the intervention, the intervention effects and main conclusions is presented in Table 1 below.

Table 1. Characteristics of studies and quality assessment

Author and Year	Country | Quality level | Study Design	Sample Characteristics	Intervention	Effects of interventions to promote physical activity in the elderly based on the Transtheoretical Model	Conclusions
Wang et al. (2020)	China (Beijing) | Level 8 | Cluster Randomized Trial	TS=189; EG=103; CG=86; EG: M= 67.38 ± 7.79 years CG: M= 68.81 ± 6.74 years. Diagnosed with Knee Osteoarthritis (KOA)	48 weeks with an intervention duration of 30-40 min/day of PA 3 times/week and a follow-up period of 24 to 48 weeks	The older participants (OP) in the EG showed significantly better results than the CG at 24, 36 and 48 weeks (p<0.001) in: pain intensity, join stiffness, lower limb muscle strength, balance, and adherence (p<0.001)	The study showed that TTM-HEI intervention program (IP) is a useful model to improve OP exercise adherence, KOA symptoms and knee function
Chen et al. (2020)	China (Beijing) | Level 8 | Cluster Randomized Controlled Trial	TS=161; EG=89; CG=72; 92.5 % Women, with both knees affected (50.3%) and did not use a walker (93.8%) Comorbidities: hypertension (36%),	24 weeks of 30-40 minutes, 3 times/week of PA based on strategies of TTM. The OP were evaluated at baseline,	Compared to CG the EG significantly decreased stiffness over 24 weeks, pain intensity, and significantly improved lower limb muscle strength and balance (all p<0.001).	A 24 weeks TTM theory based IP could improve exercise adherence, self-efficacy, decisional balance, knee osteoarthritis symptoms and physical functioning in OP with KOA.

		osteoporosis (31.1%), diabetes (11.8%), coronary heart disease (8.1%)	12 and 24 weeks of intervention	At 12 weeks of the IP, the results for perceived pros and cons of practice PA between the EG and CG didn't have no difference. However, at 24 weeks the cons of practice PA was significantly smaller than when comparing the EG to the CG (p<0.001)	The fact of the (IP) is inexpensive, safe and easy to use shows that can be applied in community centers
Yang et al. (2015)	Taiwan | Level 7 | RCT	TS=169; EG=84; CG=85; M=71.28±5.54 years; mildly dependent or independent; were in the contemplation stage or preparation stage;	PA at least for 30 min, 3 times/week	All six variables (lung capacity; cardiopulmonary fitness; upper and lower body flexibility; upper limb muscle power; lower limb muscle endurance) had significant changes. 60% of EG participants switched to the action stage after 6 months of intervention.	The TTM is a useful model to be applied to form regular exercise habits in the elderly.
Gong et al. (2015)	United Kingdom | Level 7 | RCT	TS=450; EG=232; EG: M= 64.3±5.6 years CG: 64±6,5 years; Diagnosed with hypertension; currently on antihypertensive medication; be able to attend intervention research activities; can safely participate in moderate or higher levels of PA	6 interventions sessions that include: 2 lectures; 2 sessions of telephone counseling and 2 group meetings with PA, guided by the TTM. After the 3-month follow-up assessment, there was a 2 sessions booster.	The IP was associated with higher stages of PA (at three months d=0.64, and at six months d=0.75). The effect was substantial in reducing the risk of heart attack (after six months, p<.05, d=.37) and stroke (after six months, p<.05, d=.36) and lowering blood pressure (after six months, SBP d=-0.26, DBP d=-0.36).	Evidence supports the effectiveness of this type of IP based on TTM encouraging PA among OP hypertensive patients with great potential for preventing heart attack and stroke.
Loprinzi et al. (2012)	Louisville | Level 6 | RCT	TS=69; M=70.6±1.2 years; Breast cancer survivors (BCS); complete chemotherapy or radiotherapy treatment more than two years prior to enrollment; currently inactive	3 days a week for 12 months of intervention with aerobic and resistance exercises with breast cancer survivors.	For the TTM variables in the 12-month period, BCS with greater perceived self-efficacy and greater use of behavioral change processes were more likely to be at a higher stage of change in the 18-month assessment period BCS with higher behavioral processes of change use at the point of transition were more likely to be active at 18 months (p<0.01) when compared at 12 months (p<0.0001). Also they were more likely to be in a higher perceptions of self-efficacy (p<0.001) and greater use of the behavioral process of change (p<0.001) were more likely to be classified as sufficiently active at the 18-month assessment period	Strategies to encourage self-efficacy and the use of behavioral processes may be useful in supervised (IP) to promote long-term adherence to PA by BCS
Basler et al. (2007)	Germany | Level 8 | RCT	TS=152; EG=73; CG=79; M=70.3±4.4 years; diagnosis of chronic low back pain due to osteoporosis or degenerative diseases of the spine with or without previous spine surgery; with pain at the time of inclusion	10 sessions of PA of 20 minutes per day. The EG received 10 minutes of counselling prior to every session based on TTM. The OP were evaluated at baseline, after the 10 sessions and had a follow-up period of 6 months.	Both groups showed improvement in PA (p<0.01, η^2=0.28) and self-reported functional capacity (p<0.01, η^2=0.153). Motivational training had no significant differences compared to placebo ultrasound treatment. The range of motion remained unchanged throughout the observation period	The study does not provide evidence that a short MTT-based motivation program is superior to placebo treatment in terms of adherence to PA recommendations
Findorff et al. (2007)	USA | Level 6 | RCT	TS=272 sedentary women; EG=137; CG=135.	28 weeks intervention including walking 30 minutes per day, 5 days per week, plus balance exercises twice per week	PA adoption was higher in the IG (83%) compared to CG (17%). After 1 year, the IG was in action or maintenance (60%) compared to the CG (16%). Correlations between measures of TTM constructs and adherence to the IP was most strongly correlated to adherence (.48, p<.01) and self-efficacy (.29, p<.01)	IP with TTM constructs seems to be effective in promoting PA adoption and adherence in a sedentary elderly female population with effects sustained during 1 year
Taylor et al. (2006)	USA | Level 7 | RCT	TS=134; M= 69.2 years; Lifestyle Program – 46; Educational Support –	PA during 12 weeks with aerobic, strength and flexibility exercises	Short-term results (6 months) indicated that participation in the Lifestyle Program resulted in changes in almost all MTT	The results suggest that a lifestyle program focused only on training cognitive-behavioral skills is

		51; Standard Care – 37; Prostate cancer survivors	during 3/4 times per week.	mediators, although they were not significant (p=0.20)	insufficient to promote routine PA in these OP
Irwin et al. (2004)	USA | Level 6 | RCT	TS=87, EG=87, CG=86; EG: M= 61 years, CG: M=60,6 years; sedentary; BMI [3] 25.0 kg/m² (or a BMI between 24.0 and 25.0 kg/m² if body fat percentage >33.0), without hormone replacement therapy, without clinical diagnosis of diabetes and fasting glucose <140 mg/dL and non-smokers	At least 45-min of moderate-intensity exercise 5 days/week for 12 month. OP were required to attend 3 sessions/week	There was no significant associations between high levels of adherence and the following variables: waist circumference (p=0.94), intra-abdominal body fat (p=0.49), VO_{2max}, participation in any sports or recreational PA in the last 3 months, greater stage of exercise change, greater participation in supervised exercise sessions, and greater participation in group classes. 52% of the OP adhered to at least 80% of the exercise prescription or 180 min/week), over the 12 months of interventions and 68% adhered to the current national PA recommendation of 150min/week on average over the 12 months. Only 8% of OP dropped out of the IP in the first 3 months	The best participants were individuals who had a history of practice and were in the preparation phase compared to the contemplation phase of MTT
Pinto et al. (2001)	Providence | Level 6 | RCT	TS= 355; EG= 181; CG=174; EG: 65.8±9.3 years, CG: 65.4±9 years; mean age 65,6 years; non-active patients	1 hour of sessions of PA counseling, exercise prescription and a stage-based PA manual during 8 months. Assessments were conducted at baseline, 6 and 8 months.	The IP had significant effects on psychological constructs (p<0.001) at 6 weeks, although these effects were considerably weakened at 8 months (p<.3795) the effects on behavior of PA were also weakened (p<.3216)	The results suggest that interventions of greater intensity and duration may be necessary for sustained changes in mediators and motivational readiness for PA in the elderly

Notes: TS- total sample; EG- experimental group; CG- control group; OP – older participants; BMI- Body mass index; RCT- randomized controlled trial; SBP- systolic blood pressure; DBP- diastolic blood pressure; PA- physical activity; KOA- Knee Osteoarthritis; TTM-HEI- Transtheoretical Model-Lead Home Exercise Intervention; BCS - Breast cancer survivors; IP - Intervention Program

The 10 studies used the transtheoretical model to evaluate the evolution of behavior over the course of the intervention. Moderate intensity exercises were used, and the sessions lasted between 45 and 60 minutes and consisted of aerobic exercises (walking, treadmill), strength training (machines) and balance.

Discussion

This systematic review aimed to identify the applications of the transtheoretical model and the relationship between its different constructs (i.e., stages of change, processes of change, self-efficacy) with levels of physical activity in elderly people over 65. The 10 studies selected used the transtheoretical model to evaluate the evolution of behavior throughout intervention. The following aspects were observed in the studies: i) identification of the stage of the model made it possible to find the strategies adjusted to the stage in order to increase physical activity levels and maintain these habits (Gong et al., 2015; Loprinzi et al., 2012; Pinto et al., 2001; Taylor et al., 2006; Yang et al., 2015); ii) physical exercise programs supervised by exercise professionals who know how to identify the stages of the transtheoretical model obtained better results in adherence to the practice (Loprinzi et al., 2012); iii) physical exercise programs supervised by professionals who know how to identify the stages of the transtheoretical model obtained better results in adherence to the practice (Loprinzi et al., 2012); iv) supervised physical exercise programs without using the transtheoretical model become insufficient for individuals to acquire the habit of practicing and consequently increase their levels of physical activity (Yang et al., 2015) and finally; v) physical exercise programs that applied the transtheoretical model that are not of short duration, obtained better results in increasing levels of physical activity (Pinto et al., 2001).

Moreover, theory-based interventions are more effective at improving physical activity habits than those without a theoretical foundation (Rhodes & Sui, 2021). Similarly, an approach based on one theory seems to be more effective than an approach or combination of theories (Jiménez-Zazo et al., 2020).

Rhodes and Sui (2021) suggest that the process of maintaining physical activity involves the dynamic development of action mechanisms that enhance perceived behavioral efficiency. These mechanisms partially replace earlier ones, which required greater perceived cognitive resources to engage in physical activity. This can be highlighted with elderly diagnosed with knee osteoarthritis (koa) who did an intervention program of physical activity during 48 weeks the results showed that at 24, 36 and 48 weeks the symptoms (e.g., pain intensity, joint stiffness, lower limb muscle strength and balance) improved compared with the control group, as well as an increase in adherence to practice physical exercise (Wang et al., 2020). Otherwise, a study with the same pathology and with an intervention program of physical activity only during 24 weeks, showed that 24 weeks was enough to reduce the symptoms (e.g., pain intensity, lower limb muscle strength and balance) of koa compared to the control group, although, it was not enough to perceive the pros and cons of practicing physical activity (Chen et al., 2020). Therefore, we can assume that is important to have at least 24 to 48 weeks to improve their quality of life, by reducing the symptoms of knee osteoarthritis (Chen et al., 2020; Wang et al., 2020) but to understand the importance of physical activity in their daily lives, 24 weeks it is not time enough (Chen et al., 2020). These results are also corroborated by another study with breast cancer survivors, in which the participants were more likely to be active at 18 months when compared to 12 months. At 18 months of the intervention program, the breast cancer survivors were more likely to have higher perceptions of self-efficacy and greater use of the behavioral process of change (Loprinzi et al., 2012). This suggests that longer interventions may be necessary to achieve sustained changes in behavior and self-efficacy.

Self-efficacy, in the context of physical activity behavior, refers to an individual's belief in their ability to successfully engage in and maintain physical activity. Higher self-efficacy is associated with greater confidence in overcoming barriers to exercise, which can lead to higher adherence to physical activity programs. Additionally, studies with samples related to different pathologies were analyzed to identify differences in maintaining the habit, namely increased levels of physical activity. It was observed that study groups with samples of breast cancer survivors had higher self-efficacy used more behavioral change processes at the end of a 12-month supervised physical exercise program, and were more likely to be sufficiently active at the 18-month evaluation period (Loprinzi et al., 2012). On the other hand, prostate cancer survivors who acquired a regular physical activity routine showed that using cognitive-behavioral skills training alone is an insufficient strategy to get patients to adopt the habit of maintaining an active and healthy lifestyle (Taylor et al., 2006). These data corroborate the study by Rhodes and Sui (2021), who states that although the stages of the Transtheoretical Model are important for identifying which stage the subject is in, individuals need help to acquire the motivation to initiate a behavior (i.e., autonomy, competence and social relationships) which extend to maintaining the behavior, contributing to the process of internalization and integration. Increased internalization and integration of behavior results in a shift from the controlled motivations of behavior initiation (e.g., external regulation) to more autonomous (i.e., intrinsic) motivations (Rhodes & Sui, 2021). An example of this change was seen in Findorff et al. (2007) in which during the follow-up after one year of a 28-weeks intervention program with sedentary women, the intervention group was still in stages of action or maintenance of the TTM.

Furthermore, there are also significant associations between high levels of adherence and the following variables: higher cardiorespiratory fitness, lower intra-abdominal body fat, lower waist circumference, greater participation in supervised training sessions and group classes, and even more significant stage in the behavioral change model (Irwin et al., 2004; Yang et al., 2015). In comparison, individuals with a history of practice and who are in the preparation phase show better results when compared to participants who do not practice physical activity and/or who are in the contemplation phase of the transtheoretical model of behavior change (Irwin et al., 2004). This is because individuals who are in the contemplation phase are inactive but intend to take part in physical activity in the next six months, (i.e., they are not ready for change, while in the preparation phase), the subjects are already committed to change, namely to start practicing physical activity (Prochaska & Velicer, 1997). For the subjects to be in the preparation phase, (i.e., committed to change), it was found to be important to hold education sessions before starting the physical activity program, where the importance of an active and healthy lifestyle is explored by exercise professionals specialized in this area, to improve the subjects' quality of life (Basler et al., 2007; Gong et al., 2015; Loprinzi et al., 2012).

It should also be noted that subjects who had previous habits of practice and who managed to achieve adequate body mass index values were more likely to be active six months after leaving the supervised

physical exercise program (Loprinzi et al., 2012). This can be justified by the satisfaction of basic psychological needs (autonomy, competence and relationship) (Rhodes & Sui, 2021) and thus maintaining their behaviors for more than six months, the maintenance phase (Prochaska & Velicer, 1997).

Physical activity interventions for the elderly based on the transtheoretical model thus seem to lead to positive effects. Group activities were important to stimulate motivation of adherence in the elderly who was in intervention group activities (Chen et al., 2020; Wang et al., 2020). Wang et al. (2020), refer that setting a successful example in the group was an effective method to motivate participants to start exercising or exercise regularly. It was a way to compare the adherence of participants in the same group, to the adherence of who was an "successful example". This "successful example" was one participant with high adherence and who achieved symptom relief and function improvement in knee osteoarthritis, through physical activity, which motivate participants to increase confidence and become better in practice, proving that TTM could help participants to maintain adherence to regular practice (Wang et al., 2020). In the future, strategies to increase the motivational coaching climate could be considered and integrated to maximize these effects. An empowering motivational climate, characterized by support, encouragement, and autonomy, may foster greater adherence to physical activity interventions (Findorff et al., 2007; Wang et al., 2020). Conversely, a disempowering motivational climate, marked by criticism, control, and lack of support, may hinder motivation and reduce adherence to physical activity programs (Birr et al., 2023). Therefore, interventions aimed at promoting physical activity adherence among elderly should prioritize creating an empowering motivational coaching climate. Namely, by fostering an environment that supports autonomy, competence, and relatedness. Exercise professionals can be a key part of this change, enhancing motivation levels and facilitating behavior change among elderly, which ultimately will improve their quality of life and well-being (Birr et al., 2023).

This study completed an exhaustive review of the main electronic database of the specific field and a manual search of the reference lists of the articles analyzed. One of its strengths was the inclusion of RCT studies, which a priori ensure a higher quality of research, which in turn reinforces the validity of the results. Although no language restrictions were applied, only keywords in English were used. This methodological option might have led to the exclusion of articles in the English Field that did not have a title or abstract (Mercê et al., 2021).

Limitations

The results obtained in this review support the use of the transtheoretical model in interventions aimed at encouraging physical activity habits in elderly to improve their quality of life. The results corroborated the transtheoretical model and its constructs as a valuable tool in creating, developing, and evaluating tailored interventions to promote physical activity behaviors in this phase of life. Although the results should be interpreted with caution, due to the limitations discussed above, this model (TTM) appears to be a suitable and useful tool for physical exercise professionals working with clinical populations, as it assists in determining the stage their participants are in, thus facilitating better adherence to a more active and healthier lifestyle, ultimately enhancing their quality of life.

Physical exercise professionals should consider including an approach based on the Transtheoretical Model in their intervention programs to understand the stages of change of their elderly participants and to increase adherence to physical activity and a healthy lifestyle.

Conclusions

The results of this systematic review showed that interventions based on the Transtheoretical Model are effective in increasing physical activity in the elderly, promoting improvements in exercise adherence and health outcomes such as muscle strength and mobility. Applying this model allows exercise professionals to identify their participants' stages of change and based on this information, to adjust interventions in a personalized way, thus promoting healthier behaviors in the long term. This approach contributes to the autonomy and quality of life of the elderly, proving to be a valuable tool in reducing the risks associated with ageing. In short, based on all these results, it is recommended that the Transtheoretical Model be included in physical activity programs to optimize adherence and promote active and healthy lifestyles among the elderly population.

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